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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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NIXON PEABODY, LLP
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

NELSON, ALECIA DIANE

ART UNIT PAPER NUMBER

2675

DATE MAILED: 06/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/427,639

Applicant(s)
Yamazaki et al.

Examiner
Alecia Nelson

Art Unit
2675



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Mar 15, 2002
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

2. *Claims 1-9* are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. (U.S. Patent No. 4,090,219).

With reference to *claims 1, 3, 6, and 9* the Applicant discusses the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green, and blue backlights are turned on for one-third frame duration to display an

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image corresponding to that color for one-third frame duration (see page 2, line 11-page 3, line 21).

However, there is no discussion towards displaying each of the red, green, and blue image in each subframe.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). With further reference to **claims 3 and 6**, Ernstoff et al., teaches that three light sources (204, 206, 208) representing each primary color are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A sync means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig 10 (see column 7, lines 40-58). With reference to **claims 2, 4, and 7**, Ernstoff et al. fails to specifically teach that each frame comprises 3 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer.

With reference to **claims 5 and 8** neither the applicants admittance of prior art nor Ernstoff et al. teaches or fairly disclose the usage of a ferroelectric liquid crystal in the driving method, however the usage of ferroelectric liquid crystal is well known in the art in such driving methods.

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Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to combine the drive method as taught by Ernstoff et al. to that which was admitted by the applicant with reference to conventional art, to thereby provide a liquid crystal field sequential display that has improved display quality and reduced amount of flicker observed by the user.

3. *Claims 10-31* are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. as applied to **claim 3 and 9** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art or Ernstoff et al. teaches the particular type of devices that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claims 10 and 21**, that construction of a color display with particular advantages for head-mounted and head-coupled displays (see abstract). However with reference to **claims 11-20 and 22-31**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays(see column 2, lines 34-44).

Therefore it would have been obvious to allow for the liquid crystal display device with a reduction in noticeable flickering to be constructed in a plurality of different devices to thereby increase the marketability of the product.

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4. ***Claims 32-34*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. (U.S. Patent No. 4,090,219) and Konno et al. (U.S. Patent No. 5,327,229).

With reference to ***claims 32-34*** the Applicant discusses the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green, and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. It is also taught the usage of red, green and blue LEDs which are turned on based on a video signal (see page 2, line 11-page 3, line 21).

However, there is no discussion towards displaying each of the red, green, and blue image in each subframe, nor is there discussion as to the usage of a light conductor plate for making the light rendered from the LED backlight more uniformed.

Ernststoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). Ernststoff et al. fails to specifically teach that each frame comprises 3 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. Ernststoff et al. also teaches that three light sources (204, 206, 208) representing each primary color are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A sync

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means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig 10 (see column 7, lines 40-58)

Konno et al. teaches the usage of a photo-conductive layer (23) in which the impedance thereof is fairly constant by controlling the light absorbance characteristics of the dielectric mirror (24) as such that a leakage of light is reduced and thereby providing a uniform amount of light received by the display.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to combine that which is taught by Konno et al. to the drive method as taught by Ernstoff et al. and that which is admitted by the applicant with reference to conventional art, to thereby provide a liquid crystal field sequential display that has improved display quality and reduced amount of flicker observed by the user.

5. **Claims 35-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. and Konno et al. as applied to **claims 32-34** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art or Ernstoff et al. teaches the particular type of devices that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claim 35**, that construction of a color display with particular advantages for head-mounted and head-coupled displays (see abstract).

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However with reference to **claims 36-45**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays (see column 2, lines 34-44).

Therefore it would have been obvious to allow for the liquid crystal display device with a reduction in noticeable flickering to be constructed in a plurality of different devices to thereby increase the marketability of the product.

Response to Arguments

6. Applicant's arguments filed 3/15/02 have been fully considered but they are not persuasive. The Applicant argues that the alleged Admittance of prior art either alone or in view of Ernstoff or McDowall, fails to expressly disclose or inherently suggest an n-speed field sequential color signal generation circuit operationally connected to said at least one backlight and said display section for compressing original video signals by $1/(3n)$ times in a time axis direction as set forth in independent **claims 1, 3, 6, and 9**. Further, with reference to **claims 32-45** the applicant argues that the alleged admittance of prior art fails to teach a liquid crystal display comprising a step of compressing an original red, green, and blue video signal, respectively entered from outside by $1/(3n)$ times into a respective red, green, and blue video signal. In addition the applicant states that the secondary references, Ernstoff, McDowall, and Konno, all fail to modify this deficiency since neither teach or disclose such a feature. The applicant's arguments are directed more towards the single usage of the admittance of prior art, as opposed to the combination of the admitted prior art in combination with the secondary references. The

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examiner agrees that the admitted prior art does not teach, disclose, or suggest the claimed invention in its entirety, hence the usage of the secondary references. The admitted prior art teaches a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green, and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. However, there is no discussion towards displaying each of the red, green, and blue image in each subframe. The secondary reference, Ernstoff et al., teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see Fig. 10). Granted that Ernstoff et al. teaches "n" to be equal to two, it would be obvious to have three subframes according to the teachings of the admitted prior art. Therefore, the combination of the admitted prior art and the secondary references teach compressing an original red, green, and blue video signal entered from outside by $1/(3n)$ times into a respective red, green, and blue video signal, wherein "n" is an integer larger than 2 and represents a number of subframes comprising a single frame.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any response to this action should be mailed to: Commissioner of Patents and Trademarks Washington, D.C. 20231; or faxed to (703)872-9314, (for Technology center 2600 only). Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive Arlington, VA., Sixth floor (Receptionist).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alecia D. Nelson whose telephone number is (703)305-0143.

If attempts to reach the above examiner by telephone are unsuccessful, the examiner's supervisor, Steve Saras, can be reached at (703)305-9720.

and/AND
May 30, 2002


DENNIS-DOON CHOW
PRIMARY EXAMINER